

Vermont State Rail Plan

TECHNICAL MEMO NO. 2 – VERMONT’S EXISTING STATE RAIL SYSTEM

To: Costa Pappis, AICP
Vermont Agency of Transportation

Date: March 28, 2014

From: Joseph Barr, AICP
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Project: Vermont State Rail Plan

2.1 Passenger Rail

2.1.1 General Description of Vermont’s Passenger Trains

There are two regularly scheduled passenger rail lines operating in Vermont, the Vermonter and the Ethan Allen Express. Both of these services are operated by Amtrak, with state support. In addition, the state is also served by several privately operated seasonal tourist trains.

The Vermonter operates daily service between Washington, D.C., New York, New Haven, Springfield and St. Albans, VT on a daytime schedule totaling 13 hours and 45 minutes between endpoints, covering a route distance of 467 miles. The Vermonter offers connections with the Boston-Chicago Lake Shore Limited service in Springfield, Massachusetts and northeast corridor services in New Haven, Connecticut. Major hubs where other off-corridor connections are available are at New York, Philadelphia and Washington. In 1995, the Vermonter replaced a previous service that had previously continued on to Montreal, Quebec. This service, the *Montrealer*, operated on an overnight schedule that was designed to be attractive to those traveling between the large northeastern cities and Montreal, with Vermont communities served in the middle of the night.

The Vermonter traverses 185 miles of its 611-mile route in Vermont, while serving ten passenger stations in the state. The route uses New England Central tracks for its entire journey in Vermont. Cleaning of the trainsets is performed during layover at St. Albans, while maintenance and servicing of the trainsets is performed at the southern terminal in Washington. The inability to reverse (or “turn”) trains at St. Albans results in the Vermonter trainsets having a double-end configuration. The locomotive is at one end of the train and another locomotive or a non-powered control car is at the opposite end of the train. This result in trainsets with a nonstandard configuration compared to Northeast Corridor operating practices.

Between 2010 and 2012, substantial improvements were made to the Vermonter route in Vermont and New Hampshire. Financed by \$55 million in Federal High Speed Rail funds and another \$20 million by the host railroad NECR, most rail was replaced, and other upgrades were completed that resulted in increased speeds of up to 59 mph between St. Albans and White River Junction, and 79 mph south of White River Junction and Vernon, Vermont. While these improvements were underway, occasional track outages required substitution of rail with motor coach service. In addition, track washouts west of White River Junction caused by Tropical Storm Irene resulted in a complete cessation of service between August 29 and October 1, 2011. Further track improvements are underway in Massachusetts and Connecticut as part of the Knowledge Corridor Passenger Rail Project that will reduce travel time on the Vermonter by approximately one hour.

The Ethan Allen Express provides daily service between New York City, Albany, Schenectady, Saratoga Springs and Rutland, VT, covering a total route distance of 241 miles. Begun in 1996, the Ethan Allen Express operates on a daytime schedule totaling 5:30 between endpoints.

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The Ethan Allen Express operates on 15 miles of its 241 route miles in Vermont, serving two passenger stations in the state. The Vermont mileage occurs on the privately owned Clarendon & Pittsford into Rutland. Cleaning of the trainsets is performed during layover at Rutland, while maintenance and servicing of trainsets is performed at the southern terminal in New York.

In 2010, the Ethan Allen Express stop in Fair Haven was substituted with a stop in Castleton, Vermont. Located approximately five miles apart, Fair Haven was simply a platform with a small shelter, while Castleton is a station facility with a heated waiting room and restaurant. Tropical Storm Irene caused far less disruption to the Ethan Allen Express than the Vermonter, with service being suspended for only three days.

Both the Vermonter and the Ethan Allen Express are operated using standard Amtrak intercity regional equipment, consisting of single level coaches and diesel locomotives. There are currently no plans to replace or upgrade the equipment used on these trains. Such replacement would likely occur only as part of an overall replacement of Amtrak’s intercity regional equipment.

Station stops are based on locations, which have traditionally been served by passenger trains. Due to curtailments in services over several decades, some of the original station facilities no longer exist or have passed into non-railroad use. As a result, station facilities range from nicely restored station buildings with restrooms, indoor waiting rooms, ticketing facilities and food service (Waterbury, for example) to rudimentary facilities such as Montpelier Junction. There is a need to develop station facilities which meet a set of standards for passenger amenities and which can provide a unified branding for the Vermonter and Ethan Allen Express services. A good example is the facilities and associated branding provided by the Northern New England Passenger Rail Authority’s Downeaster passenger stations in New Hampshire and Maine. Given the length of the Vermonter’s route in Vermont and number of stations, this is a greater concern for the Vermonter.

2.1.2 General Description of Vermont’s Tourist Trains

Seasonal tourist train operations are conducted from White River Junction and Bellows Falls by the Green Mountain Railroad, a subsidiary of the Vermont Railway. From White River Junction, trains operate along the Connecticut River north to Thetford, a distance of 16 miles. From Bellows Falls, train rides vary in length, going as far west as Rutland. Peak service is offered during the fall foliage season, with up to six trains per week, while during the summer months, 3-4 trains per week are operated. There are also several Christmas trains during the holiday season.

Overall, Vermont-related traffic on both trains has steadily increase over the past decade, from 57,523 in FY 2004 to over 92,000 in FY 2013. Of these totals, the Vermonter, with its broader service territory in Vermont, accounted for approximately 75 percent of the traffic, while the Ethan Allen Express handled the remainder. In FY 2013, Vermont-related Ethan Allen Express passengers traveled a typical distance of 218 miles (almost the entire distance to New York City), while the typical Vermonter passenger travels 292 miles, roughly the distance between Randolph, Vermont and New York City. Average distance traveled by Vermonter passengers has trended down slightly as a result of growing intra-state traffic, which has increased from 3 percent of passenger volumes in FY 2004 to 12 percent and over 8,000 riders in FY 2013. The three most heavily utilized stations for both inter- and intra-state travel in Vermont are Essex Junction, Brattleboro, and White River Junction, each of which have handled 15,000 or more passengers in recent years.

On-time performance of the Vermonter has ranged from a low of 40 percent in FY 2007 to a high of 89 percent in FY 2009. Following completion of track construction, Amtrak has reported on-time performance has consistently been above 80 percent. Ethan Allen Express performance was consistently below 50 percent

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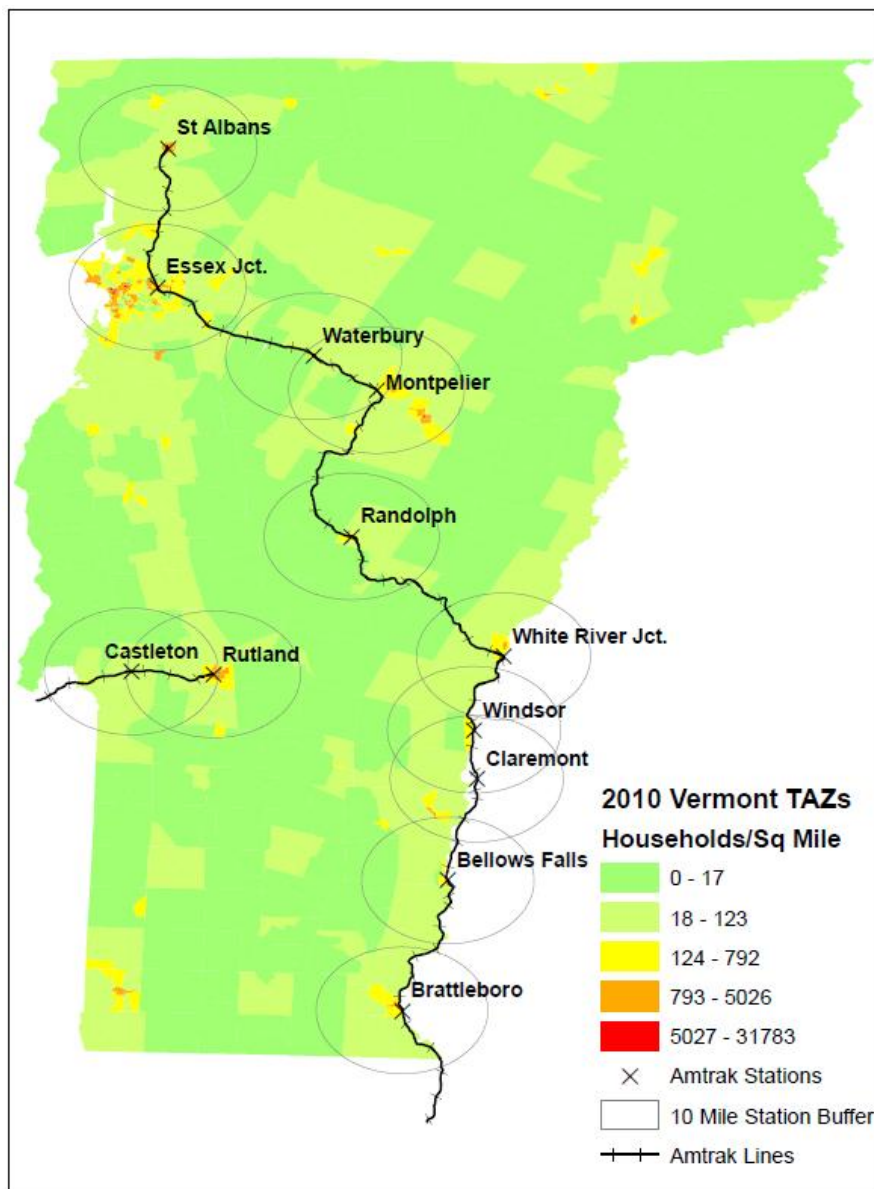
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between FY 2004 and FY 2008. Since FY 2011, performance has improved considerably (in part due to the completion of track work in various locations), but still remains at a less than satisfactory level, below 80 percent.

Vermont Residents’ Access to Intercity Rail Service

Approximately 55 percent of households and 63 percent of jobs are within 10 miles of Ethan Allen Express or Vermonter stations, according to the Vermont statewide model 2010 household data. Exhibit 2 shows how most of the population centers are within 10 miles of a rail station, with the exception of Bennington in the southwest and St. Johnsbury in the northeast.

Exhibit 1: Household Density within 10 Miles of Amtrak Stations



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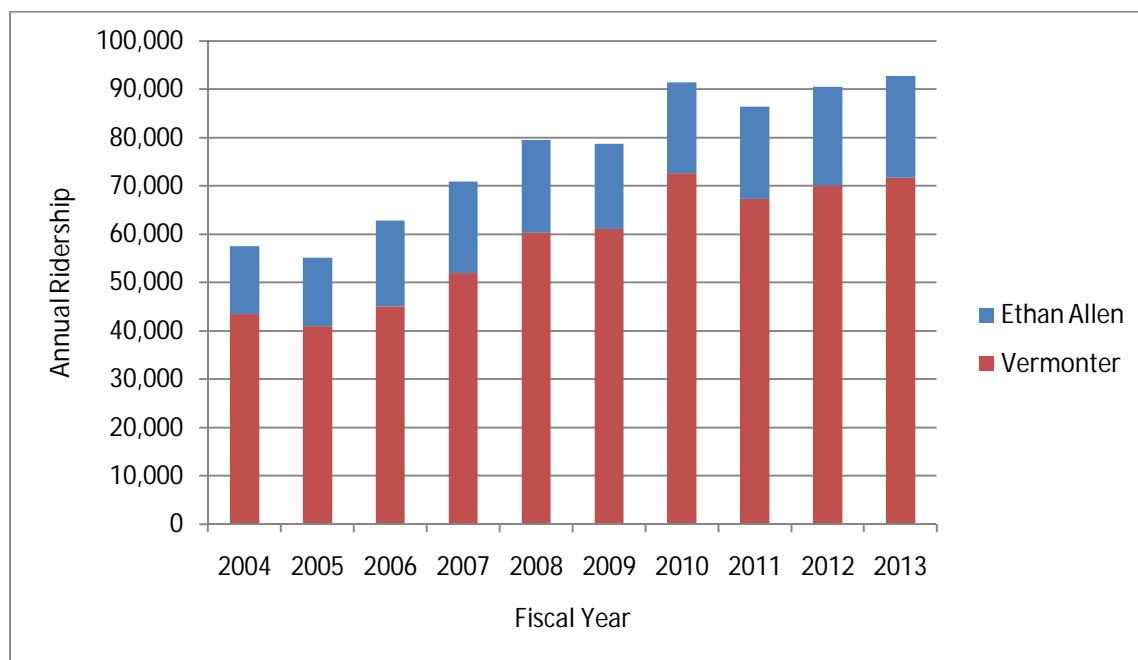
2.1.3 Utilization of Vermont’s Amtrak Services

This section first discusses ridership trends and then reviews usage by stations, density, intra-state vs. inter-state, and connections with other Amtrak services. For purposes of this analysis, Amtrak provided station-to-station ridership data for trips beginning and/or ending in Vermont from FY 2004 to 2013.¹ The data included trip portions on connecting services where passengers used more than one Amtrak route to complete their trips.

Usage by Route

Amtrak ridership on the Ethan Allen Express and the Vermonter has increased 60 percent over the last 10 years, from 57,534 trips in FY 2004 to more than 92,000 trips in FY 2013, a trend that is evident in Exhibit 2. The Vermonter – with its lengthy route and multiple stops in the state - accounts for 75 percent of all Vermont passenger rail trips. The most recent ridership peak occurred in FY 2010, when the Vermonter handled 72,634 passengers. Causes for these increases include general ridership trends on Amtrak as well as changes specific to the Vermonter. The late 2000s were marked by significant track work, which led to improved timekeeping and a smoother ride. In FY 2011, ridership dipped to 67,365, most likely due to diminished timekeeping and cancellations / service suspensions caused by track construction and Tropical Storm Irene. By FY 2013, volumes recovered to the peak level experienced in 2010.

Exhibit 2: Vermont Amtrak Annual Ridership



Ridership of the Ethan Allen Express experienced a recession-related dip in FY 2009, followed by a slow recovery. This recovery was dampened in part by poor track conditions and associated delays on the Whitehall, New York to Rutland segment. With track repairs completed in FY 2012, ridership rebounded and by FY 2013, the Ethan Allen Express’s ridership reached a new high of 21,011 passengers.

¹ Amtrak’s fiscal year runs from October through September, the same as the federal fiscal year.

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Another measure of service utilization is passenger miles traveled (PMT), which combines patronage with trip distance. Exhibit 4 shows PMTs for passengers boarding and/or alighting for each route. The PMT trend is similar to ridership trends with the peak PMT on the Vermonter in FY 2011 although the FY 2013 PMT is nearly as high. PMT on the Ethan Allen Express has increased steadily since FY 2009.

Exhibit 3: Table of Total Passenger Miles Traveled and Average Trip Distance by Route from Vermont Trips

Fiscal Year	Ethan Allen Express		Vermont	
	<i>PMT (thousands)</i>	<i>Average Trip Length (Miles)</i>	<i>PMT (thousands)</i>	<i>Average Trip Length (Miles)</i>
2004	3,198	228	13,786	317
2005	3,236	227	12,369	302
2006	3,949	223	13,641	302
2007	4,218	224	15,757	303
2008	4,327	224	18,713	311
2009	3,908	222	18,298	299
2010	4,116	219	21,973	303
2011	4,179	220	18,657	277
2012	4,497	220	20,880	298
2013	4,586	218	20,936	292

In FY 2013, Vermont-related Ethan Allen Express passengers traveled a typical distance of 218 miles (almost the entire distance to New York City), while the typical Vermonter passenger traveled 292 miles, roughly the distance between Randolph and New York City. Average distance traveled on the Ethan Allen Express has declined slightly, primarily due to the increased popularity of Castleton. On the Vermonter, it has trended down slightly because of growing intra-state traffic; however, the FY 2011 average is an anomaly due to the construction and weather-related service outages.

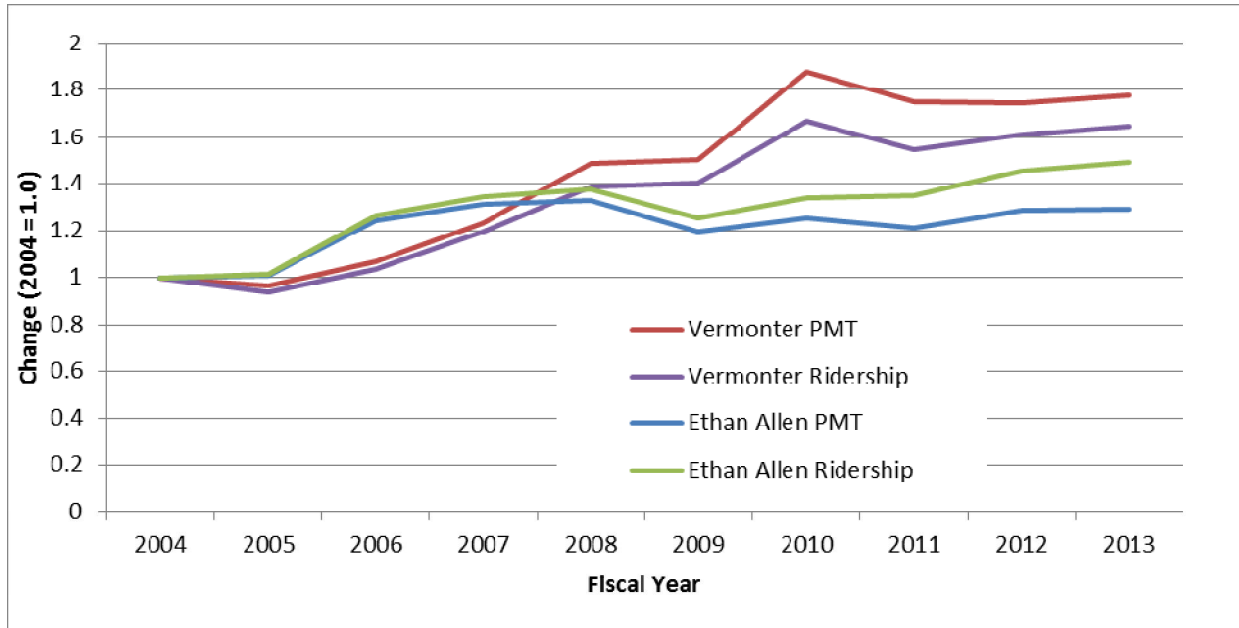
Exhibit 4 displays the relative change in trips and PMT for the Vermonter and Ethan Allen Express services from FY 2004 to FY 2013. For the Vermonter, PMTs outgrew ridership growth by 13 percentage points between FY 2004 and FY 2013, which reflects an increase in average trip length from 93.2 to 100.5 miles within Vermont.

The PMT trend on the Ethan Allen Express shifted slightly in the opposite direction, with ridership increasing faster than PMT. This is the result of ridership growth at the Castleton station exceeding that of Rutland, and an associated trip that is 12 miles shorter than from Rutland. As Rutland traffic grew slightly from 2010 onward, when the switch from Fair Haven to Castleton took place, it seems that there was little if any diversion from Rutland to the new station (see further discussion below and Exhibit 5).

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Exhibit 4: Vermont Amtrak Change in Annual Ridership and Passenger Miles Traveled (PMT) in Vermont

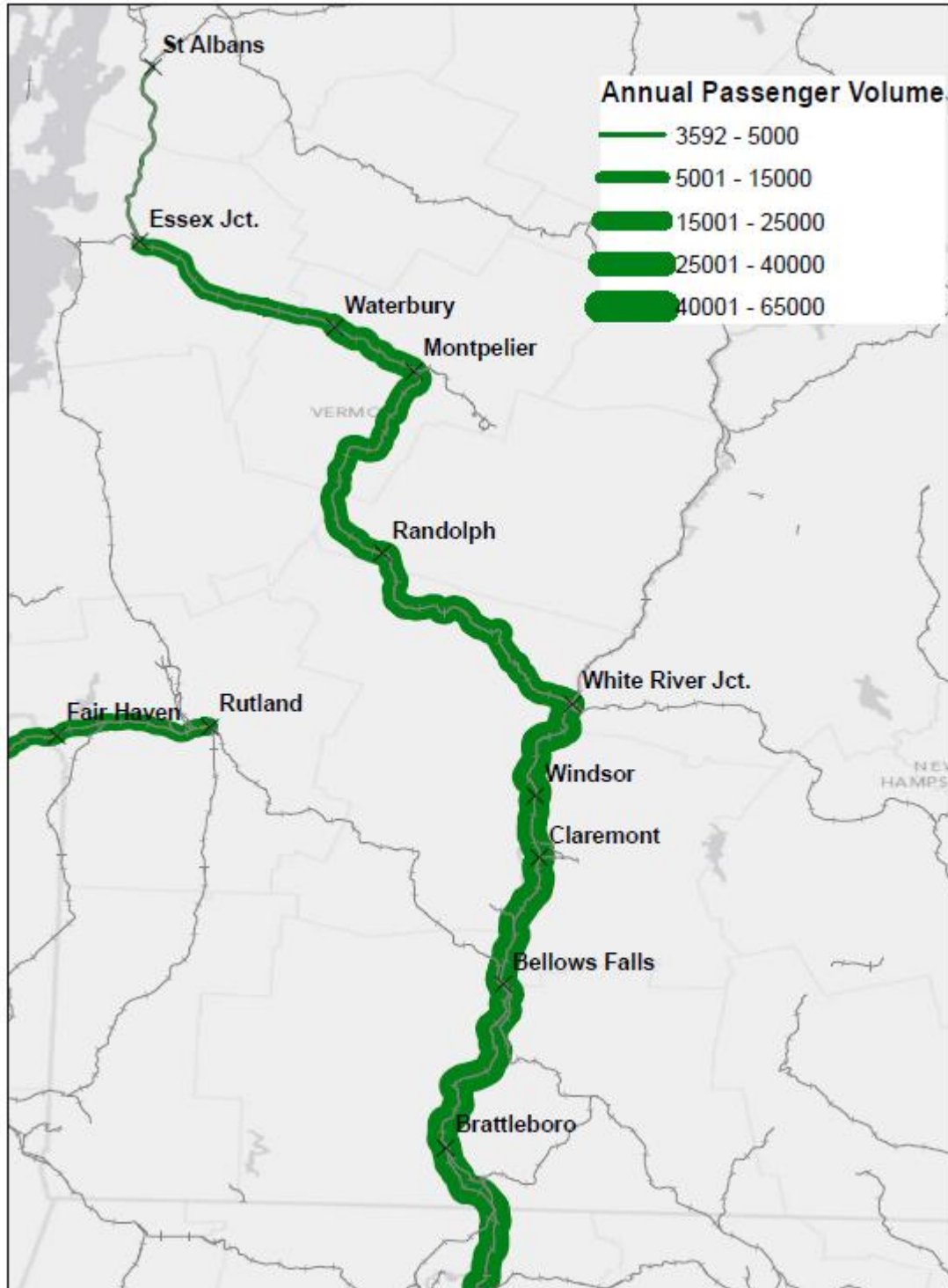


Passenger volume density along Vermont’s Amtrak passenger routes is shown in Exhibit 5. With both routes, traffic consistently builds up as the routes exit Vermont, since the primary destinations are located beyond the state’s borders. There is virtually no intra-state traffic on the Ethan Allen Express, and while approximately 12 percent of the Vermonter’s traffic is intra-state, it generally follows the same pattern as the interstate traffic on the route.

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Exhibit 5: FY13 Annual Passenger Volume Density



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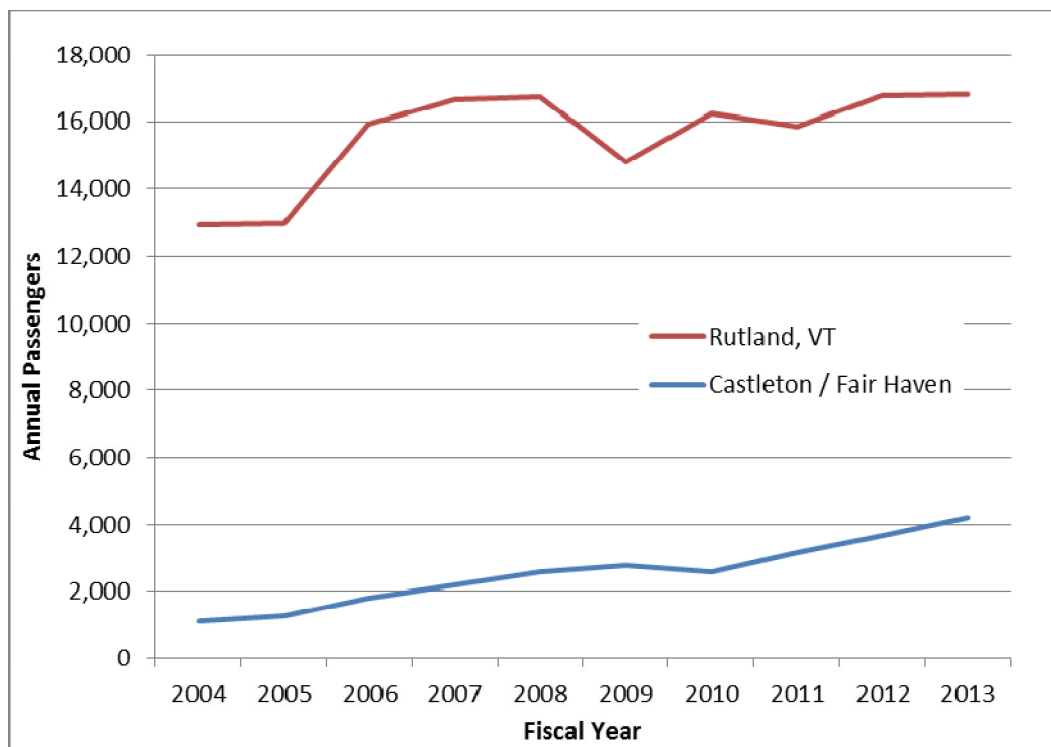
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Station Activity

Exhibit 6 and Exhibit 7 show the annual station passenger activity for the Ethan Allen Express and Vermonter Vermont stations respectively. For the Ethan Allen Express, statistics for Fair Haven and Castleton have been combined, with the former being closed at the same time that the latter opened in 2010. It is evident though that the superior facility at Castleton has had a positive effect on ridership, with volume almost doubling between FY 2010 and 2013 to 4,211 passengers. Nevertheless, Rutland retains its status as Vermont’s most important station on the Ethan Allen Express.

The top three stations on the Vermonter, Essex Junction, White River Junction and Brattleboro, account for more than two-thirds of the total passenger activity. Brattleboro and Essex Junction account for much of the ridership growth since FY 2004. Since FY 2010, Brattleboro has continued to grow, with its 2013 volume now second only to Essex Junction, while Essex Junction and White River Junction station volumes have declined somewhat.

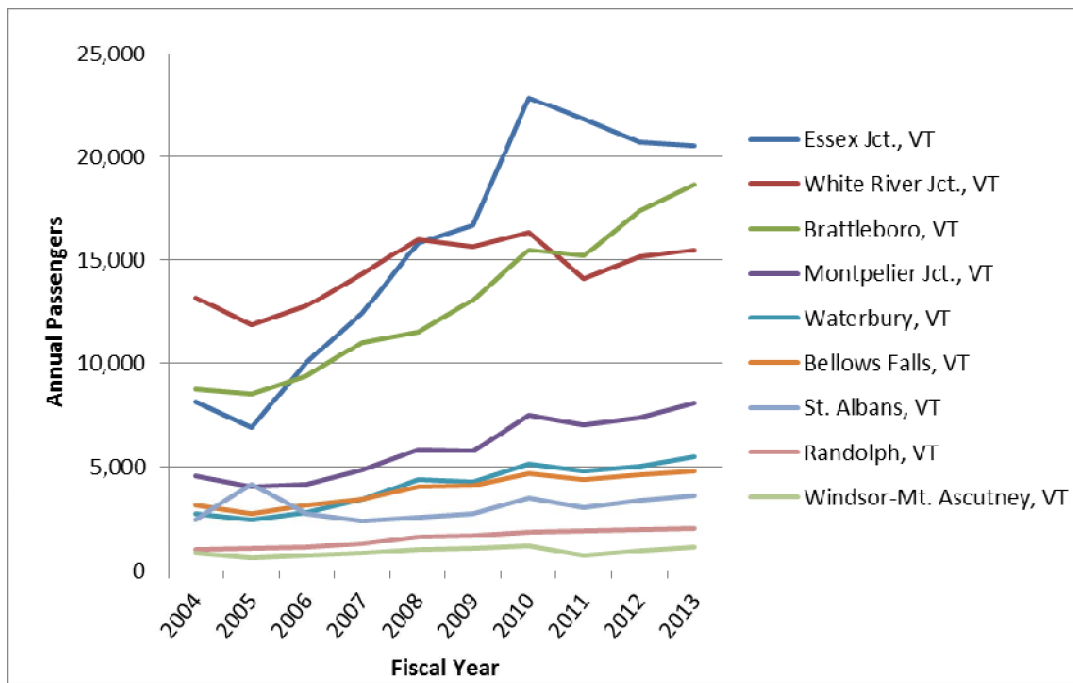
Exhibit 6: Ethan Allen Express Vermont Station Activity



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Exhibit 7: Vermonter Vermont Station Activity

*Intra- and Inter-State Trends*

As expected, practically all ridership on Ethan Allen Express is interstate given that there are only two stations located in the state. The Vermonter, however, has a significant portion of intra-state trips that has grown sharply – over 600 percent - since 2004. Exhibit 8 shows that the percentage of intra-state trips on the Vermonter has increased from 3 percent in FY 2004 to almost 8,400 riders and 12 percent in FY 2013. The number of interstate trips grew by 50 percent during this period, from approximately 42,000 to more than 63,000.

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Exhibit 8: Vermonter Inter- and Intra-state Patronage Growth

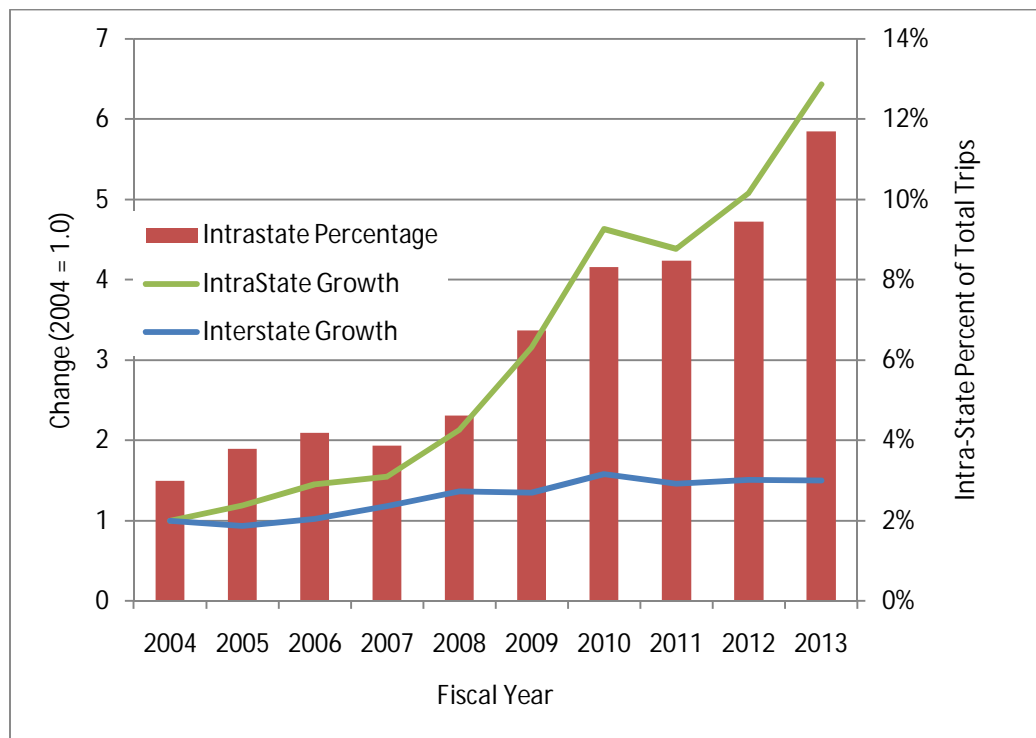


Exhibit 10 shows FY 2013 station-to-station intrastate passenger volumes. Representing 30 percent and 2,552 passengers, the most common intra-state trip was between Brattleboro and Essex Junction, a distance of 157 miles. In second place at 10 percent and 853 riders stood White River Junction – Essex Junction, a distance of 94 miles. Much of the remaining intra-state traffic also included one of these three stations as a start or end-point.

Exhibit 11 and Exhibit 12 shows the linked interstate trip ends by state for the Vermonter and the Ethan Allen Express, respectively. **Error! Reference source not found.** Exhibit 13 details travel between Vermont and New York State destinations on the Ethan Allen Express.

Upward trends in the overall ridership for both routes are evident at the state level, with all but one state (Florida) experiencing increases between FY 2004 and 2012. On the Vermonter, strong growth was experienced in both Massachusetts and Connecticut, with the former increasing from 1,746 in 2004 to 5,437 riders in 2012, an increase of 211 percent. The Ethan Allen Express saw a 38 percent increase in traffic with its primary market in New York State, but many markets requiring connections – such as Virginia, Maryland the District of Columbia - grew even faster.

As expected, New York City is the most popular trip end for Vermont rail travel. For the Vermonter, the only station stop in New York is New York City, while all but two of the Ethan Allen Express twelve stations are in New York State. Given its continuous route to Washington, the Vermonter’s top ten states for ridership are concentrated along the Northeast Corridor, with the exception of 9th place Florida. Rhode Island, at 10th place, requires a rather circuitous route through either New Haven or Boston.



Exhibit 10: Table of Amtrak FY 2013 Vermonter Intrastate Ridership

Station	distance (miles)	Destination											Total
		St. Albans, VT	Essex VT	Jct., VT	Waterbury, VT	Montpelier Jct., VT	Randolph, VT	White River Jct., VT	Windsor-Mt. Ascutney, VT	Claremont, NH	Bellows Falls, VT	Brattleboro, VT	
St. Albans, VT	0		150	8	16	34	115	21	9	38	248		639
Essex Jct., VT	24	21		79	99	90	480	60	79	263	1,248		2,419
Waterbury, VT	47	57	30		26	16	35	5	7	91	340		607
Montpelier Jct., VT	56	12	29	11		14	136	2	12	33	260		509
Randolph, VT	86	24	78	0	12		43	5	2	3	102		269
White River Jct., VT	118	118	373	21	27	26		28	15	79	239		926
Windsor-Mt. Ascutney, VT	131	16	67	3	2	2	6		6	0	15		117
Claremont, NH	140	16	81	8	12	1	11	2		4	13		148
Bellows Falls, VT	157	43	311	29	29	2	26	0	4		61		505
Brattleboro, VT	181	201	1,304	152	280	45	183	12	15	52			2,244
Total		508	2,423	311	503	230	1,035	135	149	563	2,526		8,383

Exhibit 91: Table of Amtrak Vermonter Interstate Ridership by State²

	Fiscal Year								
	2004	2005	2006	2007	2008	2009	2010	2011	2012
NY	18,257	17,982	20,729	23,461	26,231	26,531	29,635	26,052	26,642
CT	5,447	5,911	6,035	7,330	7,960	8,414	9,943	9,206	9,536
DC	4,712	3,596	3,954	4,964	6,280	6,005	7,525	6,990	7,602
PA	4,587	3,675	4,067	4,316	5,746	5,438	5,984	5,328	6,204
MA	1,746	2,466	2,646	3,191	3,462	4,092	5,073	6,854	5,437
NJ	3,133	2,669	2,706	2,972	3,433	2,963	3,766	3,200	3,305
MD	2,058	1,716	1,862	2,418	2,592	1,958	2,863	2,511	2,928
DE	886	737	799	891	1,181	1,060	1,219	1,062	1,248
FL	667	177	84	68	78	111	92	56	47
RI	67	89	97	108	134	135	200	153	206
Other	708	449	359	360	487	497	505	368	478
Total	42,268	39,467	43,338	50,079	57,584	57,204	66,805	61,780	63,633

² Unlinked trip data was available through FY 2013, while linked trip was available only through FY 2012.



Exhibit 102: Table of Amtrak FY 2013 Ethan Allen Express Unlinked Trip Ridership

Station	distance (miles)	Destination												Total
		Rutland, VT	Castleton, VT	Fort Edward NY	Saratoga Springs, NY	Schenec- tady, NY	Albany- Rensse- laer, NY	Hudson, NY	Rhine- cliff, NY	Pough- keepsie, NY	Croton- Harmon, NY	Yonkers, NY	New York, NY	
Rutland, VT	0		15	17	103	479	358	86	70	169	134	87	6,928	8,446
Castleton, VT	9	0		3	12	50	80	5	9	55	60	24	1,770	2,068
Fort Edward, NY	44	13	4											17
Saratoga Springs, NY	63	167	11											178
Schenectady, NY	82	454	70											524
Albany-Rensselaer, NY	100	379	71											450
Hudson, NY	128	105	11											116
Rhinecliff, NY	153	77	21											98
Poughkeepsie, NY	169	151	49											200
Croton-Harmon, NY	209	122	49											171
Yonkers, NY	227	92	12											104
New York, NY	241	6,809	1,830											8,639
Total		8,369	2,143	20	115	529	438	91	79	224	194	111	8,698	21,011

Exhibit 11: Table of Amtrak Ethan Allen Express Interstate Ridership by State³

	Fiscal Year								
	2004	2005	2006	2007	2008	2009	2010	2011	2012
NY	12,384	12,944	16,074	16,865	16,958	15,395	16,285	15,968	17,107
PA	439	346	415	447	651	590	667	750	779
DC	476	315	317	432	525	526	665	787	802
MD	155	160	213	168	224	155	251	283	327
IL	135	134	157	174	150	202	208	208	236
FL	105	83	169	223	213	174	112	203	233
VA	103	82	76	98	160	171	159	266	280
NJ	66	43	65	97	118	108	108	126	162
DE	47	44	81	110	81	58	94	105	114
GA	18	15	26	48	84	41	30	48	84
Other	98	86	128	175	142	159	214	248	293
Total	14,026	14,252	17,721	18,837	19,306	17,579	18,793	18,992	20,417

³ Unlinked trip data was available through FY 2013, while linked trip was available only through FY 2012.

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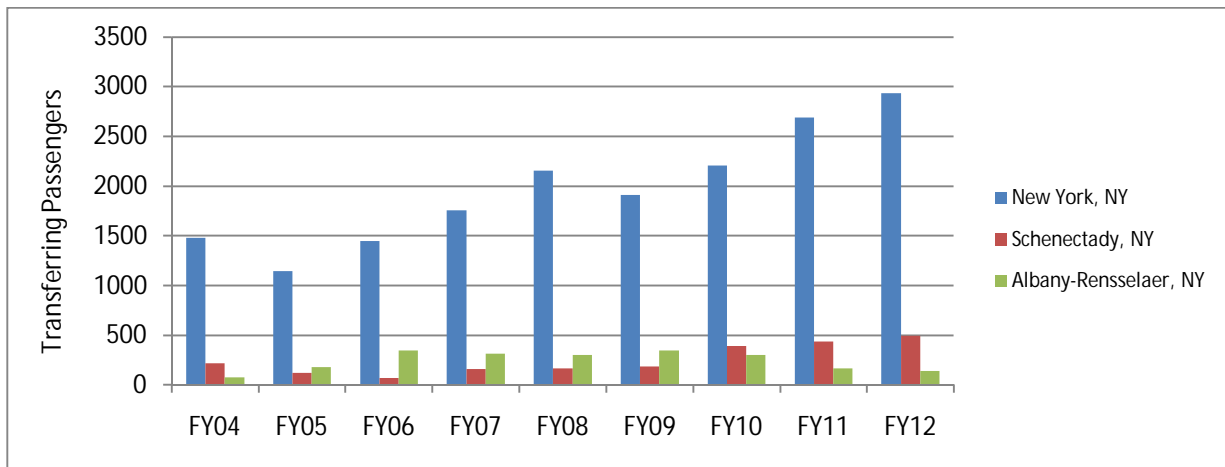
While New York State's dominance for Ethan Allen Express traffic is hardly surprising, it is noteworthy that Illinois is in 5th place, followed by Florida in 6th, and Virginia in 7th place. All of these destinations require a change of trains in New York City, or, for those traveling west, in Albany or Schenectady.

Connecting Stations

In order to connect to other Amtrak services, passengers traveling to or from Vermont change trains at several locations. Exhibit 14 and Exhibit 15 show Vermont-related passenger volumes at the stations where most transfers take place for the Ethan Allen Express and Vermonter, respectively. As expected, the majority of passengers transferring to the Ethan Allen Express do so in New York City. The Schenectady and Albany-Rensselaer stations handle transfers with the Lake Shore Limited to Chicago and other trains serving Buffalo, Niagara Falls and Toronto. The shift in volume between Schenectady and Albany-Rensselaer that occurred between FY 2009 and 2011 is the result of schedule changes that made Schenectady the preferable location for some transfers.

On the Vermonter, Springfield, MA has been the busiest transfer point since FY 2007. Note that FY 2011 is omitted from the chart because Vermonter service was substituted by bus connections during track work and rebuilding after Tropical Storm Irene. Evidently, this was reported as a connection in Amtrak's data, skewing the data and results

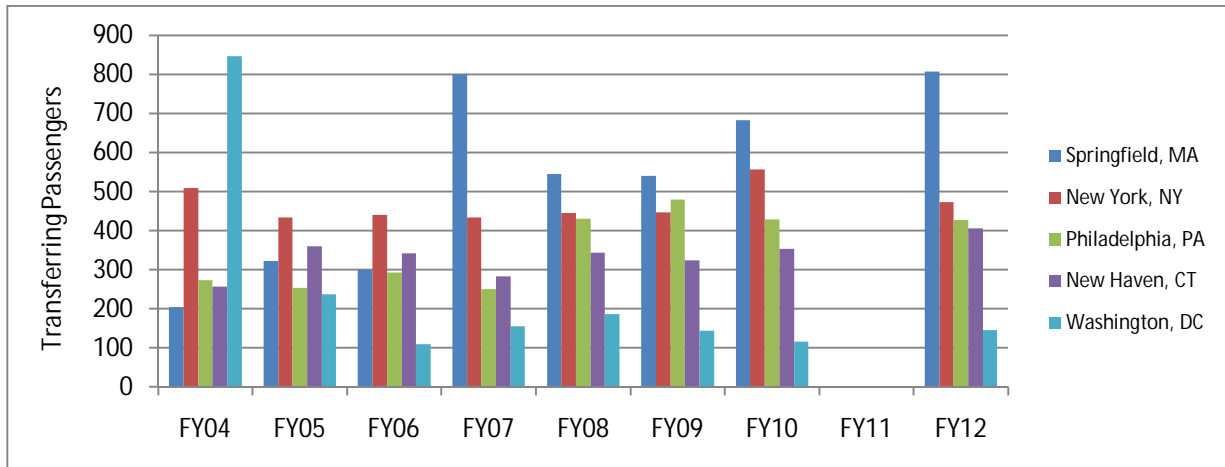
Exhibit 12: Amtrak Ethan Allen Connecting Stations Ridership



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Exhibit 13: Amtrak Vermonter Connecting Stations Ridership⁴



2.1.4 Service Reliability

A key measure of service performance is reliability, or the degree to which a train operates on-schedule. Good performance in this regard has a major impact on both revenues and costs – unreliable service discourages use and raises costs through increased fuel use, personnel, diminished equipment utilization, and, in extreme situations, compensating passengers with refunds, reimbursement for alternative transportation, etc. Amtrak considers a train to be “on-time” if it arrives at the final destination within a threshold that varies based on route length. The on-time threshold for the Ethan Allen Express is 10 minutes and the threshold for the Vermonter, which operates over a route that is more than twice as long, is 30 minutes. The number of trains within the threshold is divided by total trains over a period to calculate the on-time percentage (OTP).

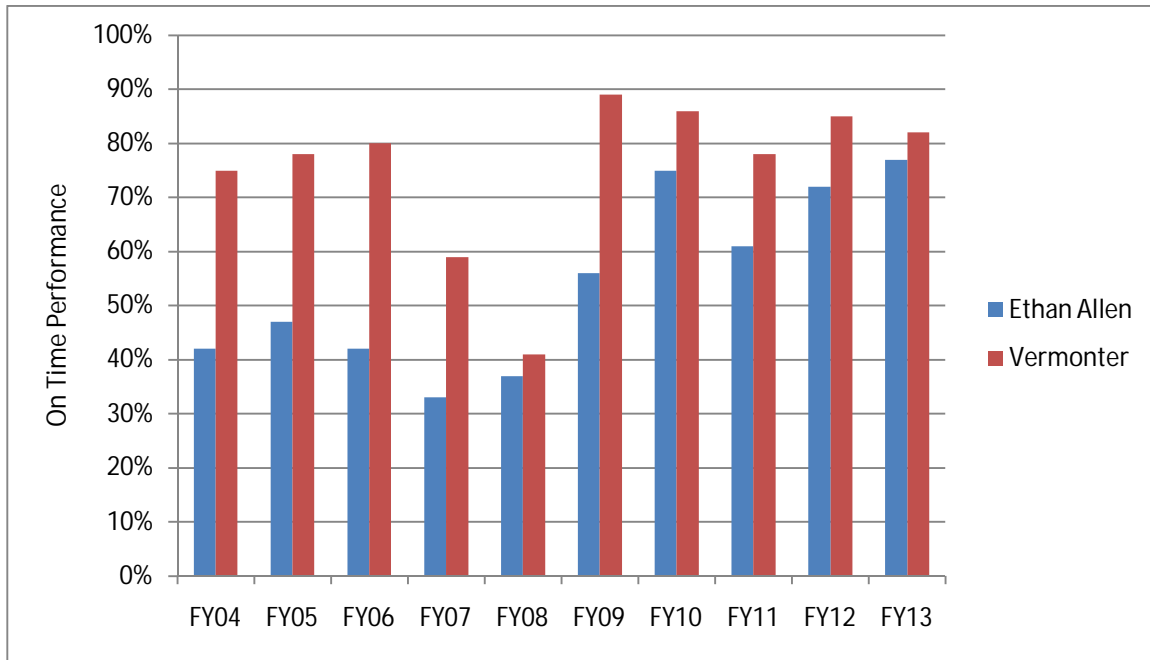
Since FY 2004, OTP was varied considerably on both lines. Overall, the Vermonter has experienced better on-time performance than the Ethan Allen Express, although FY 2008 was a low point for both routes. In the late 2000s the two routes experienced significant delays due to track conditions in Vermont, and the Ethan Allen Express suffered from significant congestion-related delays in New York. Following completion of track maintenance on the Vermonter in 2008, performance on that route improved to 80 percent or better, except in FY 2011 for the reasons noted previously. Performance on the Ethan Allen Express has also improved steadily since FY 2011, in part due to completion of track work between Whitehall, NY and Rutland, and track capacity upgrades on the CP south of Whitehall, NY.

⁴ FY11 transfer data not shown due to higher transfers around track work

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Exhibit 14: On-Time Performance



2.2 Freight Rail

2.2.1 General Description of Vermont's Freight Rail Network

Pan Am Railways (PAR) is the holding company previously known as Guilford Rail System. PAR operations in Vermont include seven miles of former Boston & Maine Railroad main line from Mechanicville, NY to Lowell, MA which transverses the southwest corner of Vermont. This line has recently been upgraded in a joint undertaking between PAR and the Norfolk Southern (NS) railway. Termed the "Patriot Corridor," the PAR/NS partnership is aimed at giving NS a competitive position in the New England area with respect to its Class I rival CSX Corporation. PAR also operates trains via trackage rights on the NECR between East Northfield Mass and White River Junction. PAR's system also includes ownership of the Main Central Railroad (see inactive section)

Canadian National (CN) operates three miles of track in Vermont that connects NECR with its through line to Montreal and other Canadian destinations.

Vermont Rail System (VRS) is comprised of 5 properties, with a mixture of public and private ownership of the underlying infrastructure, but with private operations by VRS. The components of VRS are as follows;

Clarendon & Pittsford Railroad (CLP) is a privately owned and operated railroad with a total of 25 miles of which 18 miles are located in Vermont. The CLP operates between Rutland and Whitehall NY acting as a bridge line carrier for shipments to and from Vermont connecting with

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the Canadian Pacific. At Rutland connections are provided with the Green Mountain railroad and the Vermont Railway. CLP also hosts Amtrak's Ethan Allen Express service which presently terminates at Rutland but which is envisioned to be extended to Burlington in the future. The CLP also provides a gateway to the national rail network for Vermont's largest rail shipper OMYA, Inc. located at Florence. The line has recently been upgraded.

Connecticut River Subdivision of the WACR is a state-owned section from White River Junction to Newport Yard. It is operated by the Washington County Railroad. It connects with the Montreal Maine & Atlantic in Newport in Newport and the PAR in White River.

Green Mountain Railroad (GMR) is state-owned and privately operated that provides freight service between Rutland and Bellows Falls over a 50-mile line. Operations began in 1965. Its primary freight connections are with PAR and NECR at Bellows Falls, Vermont Railway at Rutland, and CSX Transportation at Palmer, MA through a haulage arrangement with NECR.

Vermont Railway (VTR) is a state-owned and privately operated line with a partnership with the State of Vermont dating back to 1964. It operates freight and excursion passenger services along its route. The VTR runs from Burlington to North Bennington where a spur serves Bennington while the main line continues to Hoosick Junction, NY with a connection to PAR. VTR also interchanges with NECR at Burlington, with Canadian Pacific at Whitehall (via the CLP), and with GMRC at Rutland. VTR hosts Amtrak's Ethan Allen Express service at Rutland and operates seasonal excursion passenger services. The portion of the line between Rutland and Burlington is the focus of intense efforts aimed at upgrading the track and associated infrastructure to accommodate Amtrak service to Burlington and 286,000-pound freight cars.

Washington County Railroad (WACR) is a state-owned privately operated railroad extending from Montpelier Junction to Barre. It connects with the NECR at Montpelier Junction. In 2000, the State of Vermont purchased the upper portion of the Guilford Rail System (now PAR) Connecticut River Line between White River Junction and Wells River. The state assigned operation of this line to the Washington County Railroad, as noted above in the description of the Connecticut River Subdivision of the WACR. PAR operates over the southern portions of the Connecticut River Line from White River Junction to East Deerfield, MA. Following bankruptcy of the Bangor and Aroostook Railroad, the State of Vermont purchased the former Canadian Pacific 62-mile line segment between Wells River and Newport and WACR was designated as the interim operator.

Montreal, Maine & Atlantic (MMA) has 745 miles of track, with 24 miles located in Vermont and associated trackage rights. It operates from the Newport Rail Yard through Troy, VT into Quebec and then back into Vermont to serve Richford. The line then continues back into Quebec and points north. The MMA is currently in bankruptcy proceedings, and Railway Acquisition Holdings, LLC was recently confirmed as the expected buyer of the MMA's assets, and has indicated that it will rename the railroad the Central Maine and Quebec Railway.

New England Central Railroad Company (NECR) is a wholly owned subsidiary of Genesee & Wyoming Inc, a publicly traded short line holding company and as such is part of an expanding international family

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of 60 railroads. NECR operates 325 miles from the Canadian border at East Alburg to New London, CT. Major interchange locations are with Canadian National at East Alburg, PAR at White River Junction, GMRC at Bellows Falls, CSX Transportation at Palmer, MA, Providence & Worcester Railroad at Willimantic and New London, CT. A connection is achieved with the Vermont Railway at Burlington via the NECR Winooski Branch. NECR hosts the Amtrak Vermonter service from its CSX connection at Palmer, MA to its present terminus at St. Albans. The line is nearing completion (2014) of an upgrade which will accommodate 286,000 pound cars for its entire length in Vermont and which will support higher operating speed limits for passenger rail services.

St. Lawrence & Atlantic (SLR) is a wholly owned subsidiary of Genesee & Wyoming Inc., which operates 165 miles of track in Maine and Vermont. SLR operates 31 miles in Vermont from Norton to North Stratford, NH. It is currently the only rail line in Vermont that is capable of handling full height double stack freight rail cars over its entire length. SLR interchanges in Norton with its Canadian affiliate St Lawrence & Atlantic (Quebec, or SLQ) which provides a connection with the Canadian National at Richmond, QC.

2.3 Freight Demand

This section examines the current rail freight demand in the State of Vermont. An analysis was performed for the rail traffic in the state, including domestic and international flows. The primary source of data for rail freight demand consisted of the Surface Transportation Board's (STB) 2011 Confidential Carload Waybill Sample. Additionally, the latest Federal Highway Administration's Freight Analysis Framework version 3.4 (FAF3.4) data were used as the source for the modal share analysis.

In 2011, Vermont generated about 39 million tons of freight, excluding through traffic, of which rail carried about 5 percent of Vermont's freight by tonnage. In 2011, 6.6 million tons of freight moved into, out of, within, or through the Vermont's rail system. Approximately 961,000 tons (14 percent) traveled inbound, 775,000 tons (12 percent) traveled outbound, and 326,000 tons (5 percent) traveled within the state. Through freight comprised a major part of the overall rail freight volume accounting for 4.6 million tons or 69 percent of the total. Through traffic is critical to the continued vitality of rail service in Vermont and Vermont's strategic geographic position, as one of the gateways to Canada is a key element.

The top commodities by weight transported into, out of, within, and through the state by rail in 2011 were: pulp, paper or allied products; clay, concrete, glass or stone products (i.e., limestone slurry); lumber or wood products; chemicals or allied products; coal; petroleum or coal products (i.e., gasoline, gas propane, petroleum, and fuel oil); food products; and, non-metallic minerals (i.e., rock salt). Outbound rail shipments were comprised almost entirely (99 percent) of limestone slurry.

Vermont's top trading partners for inbound and outbound rail shipments are New York, Canada, Maine, and the South Atlantic region. These trading partners account for 75 percent (1.3 million tons) of total inbound and outbound rail flows by weight.

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2.3.1 Current Freight System Demand

In 2011, freight volume associated with Vermont totaled approximately 39 million tons, excluding through traffic. Trucks carried 91 percent of all inbound, outbound and intrastate freight tonnage. Rail carried about 5 percent of freight on a tonnage basis. Exhibit 15 indicates the estimated tons of freight movement by direction and by mode. These estimates were made using the provisional tonnage from the Federal Highway Administration's (FHWA) Freight Analysis Framework version 3.4 (FAF3.4), and the 2011 tonnage data on rail demand from the Surface Transportation Board's (STB) Confidential Carload Waybill Sample.

Exhibit 15: Freight Movements over All Modes by Direction and by Mode 2011 Weight (in Thousands of Tons)

Mode	Inbound	%	Outbound	%	Intrastate	%	Total	%
Truck ^a	11,990	90%	7,740	87%	15,383	93%	35,113	91%
Rail ^b	961	7%	775	9%	326	2%	2,062	5%
Multiple Modes & Mail ^a	107	1%	75	1%	5	0%	186	0%
Air ^a	3	0%	2	0%	0	0%	5	0%
Other ^a	338	3%	260	3%	900	5%	1,498	4%
TOTAL	13,339	100%	8,851	100%	16,614	100%	38,864	100%

Source:

^a FHWA FAF3 2011 Provisional estimates

^b STB 2011 Confidential Carload Waybill Sample data

Notes:

Multiple modes and mail includes shipments by multiple modes and by parcel delivery services, U.S. Postal Service, or couriers. This category is not limited to containerized or trailer-on-flatcar shipments.

Top Freight Markets Across All Modes

According to FAF3.4 provisional data for 2011⁵, Vermont's top trading partners for inbound and outbound flows across all modes were New York, New Hampshire, Massachusetts, and Canada. In 2011, freight flows between Vermont and New York totaled 7.9 million tons. Eighty-six percent of the trade between New York and Vermont was inbound (New York to Vermont) and 14 percent was outbound (Vermont to New York). Commodities largely consisted of base metals, gasoline, nonmetallic minerals, mixed freight (which include consumer durable and non-durable goods), and fuel oils. Truck traffic accounted for the vast majority (83 percent) of the freight tonnage moved between Vermont and New York, and rail represented 16 percent of the tons moved between the two states.

In 2011, freight flows between Vermont and New Hampshire amounted to 6.5 million tons. The trade between these two states was very balanced with 53 percent outbound (Vermont to New Hampshire) and 47 percent inbound (New Hampshire to Vermont). These shipments moved almost entirely by truck, with little or no rail-bound traffic. The top commodities moving between these two states were cereal grains, other agricultural products, coal and petroleum products, gravel, and non-metallic minerals.

⁵ The FAF3.4 2011 provisional data is synthesized from the 2007 base year data.

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In 2011, 2.9 million tons of freight moved between Vermont and Massachusetts. The trade between the two states was balanced, with half of the tonnage moving inbound (Massachusetts to Vermont) and half outbound (Vermont to Massachusetts). Commodities moving in this market include paper articles, basic chemicals, animal feed, newsprint and paper, and mixed freight. Truck traffic accounted for 85 percent of the tons moved between the two states, while rail accounted for 14 percent.

Traffic moving across the U.S. – Canada border in Vermont totaled approximately 6.8 million tons. Of this amount, 2.5 million tons originated or terminated in Vermont and the rest was through traffic. Most of the tonnage (73 percent) crossing the border in Vermont came from Canada. Seventy-three percent of the total tonnage was hauled by truck and 22 percent by rail, with the top commodities consisting of coal and petroleum products, paper articles, animal feed, newsprint and paper, wood products, and non-metallic mineral products.

2.3.2 Current Rail System Demand

In 2011, 6.6 million tons of freight moved into, out of, within, or through the Vermont's rail system. Approximately 961 thousand tons (14 percent) traveled inbound, 775 thousand tons (12 percent) traveled outbound, and 326 thousand tons (5 percent) traveled within the State. Through freight accounted for 4.6 million tons or 69 percent of the total.

Rail Directional Analysis

Directional analysis describes and compares the magnitude of freight, in terms of weight, moving over the state's rail infrastructure by direction. It also can help reveal the underlying economic structure of the region. Every rail freight shipment can be categorized as moving in one of four directions – inbound, outbound, intraregional, or through. Rail freight flows are assigned a direction according to the following definitions:

- Inbound rail movements originate outside of the state and terminate within the state. Inbound rail freight represents imports to the state. Because consumers and businesses must pay for goods received, inbound freight is also associated with a corresponding outflow of dollars from the region.
- Outbound rail freight movements originate within the state and terminate outside of the state. Outbound rail freight represents exports from the state and is considered wealth-generating freight because it is associated with an inflow of dollars to the region.
- Intraregional rail freight movements originate and terminate within the state. Intraregional rail moves represent the degree to which the state is trading with itself.
- Through rail freight, movements originate outside of the region, traverse the region, and terminate outside of the region. Through freight moves, while very important for the national and global economy, do not directly influence the statewide economy to a significant degree; however, the movement of through freight does utilize and affect the state's rail infrastructure as a means to reach its final destination, and provides significant traffic that support the overall viability of rail freight in Vermont.

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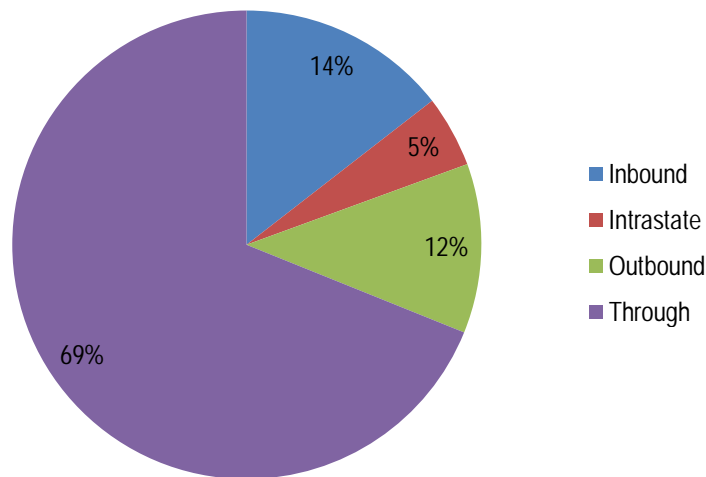
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In 2011, Vermont's freight railroads moved 6.6 million tons of freight. By type of rail equipment – carload or intermodal container – the data show that, 91 percent of tonnage is carried in railcars and 9 percent in intermodal containers. In 2011, all of the intermodal containers and trailers traveling through the state were associated with Pan Am Railway's line between Mechanicville, NY and the Boston region that cuts through the far Southwestern corner of Vermont.

Exhibit 16 charts the rail tonnage of inbound, outbound, intrastate and through freight for 2011. Through movement was dominant, accounting for 4.6 million tons and 69 percent of the state's freight carried by rail. Fourteen percent of traffic (961 thousand tons) terminated in the state, while 12 percent (775 thousand tons) originated in the state. Intrastate rail freight accounted for 5 percent or 326 thousand tons of the total rail movements.

Exhibit 16: Rail Volume by Direction

2011 Weight



Top Rail Commodities

The top commodities by weight transported into, out of, within and through the region by rail in 2011 are shown in

Exhibit 17 and

STCC2	Commodity	Rail Freight Movements (in thousands of tons)					Percent
		Inbound	Intrastate	Outbound	Through	Total	
26	Pulp, Paper, or Allied Products	8	0	3	1,144	1,155	17%
32	Clay, Concrete, Glass or Stone Products	12	0	766	270	1,048	16%
24	Lumber or Wood Products, exc Furniture	79	282	0	454	815	12%
28	Chemicals or Allied Products	37	0	2	771	810	12%

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11	Coal	0	0	0	584	584	9%
29	Petroleum or Coal Products	232	0	0	285	517	8%
20	Food or Kindred Products	227	0	0	254	481	7%
14	Non-metallic Minerals	273	44	0	16	333	5%
46	Freight All Kind	0	0	0	255	255	4%
37	Transportation Equipment	0	0	0	153	153	2%
33	Primary Metal Products	17	0	0	105	122	2%
01	Farm Products	76	0	0	41	117	2%
40	Waste or Scrap Materials	0	0	4	67	71	1%
	Other	0	0	0	168	168	3%
	TOTAL	961	326	775	4,567	6,628	

Exhibit 18. The largest commodity group in terms of tonnage is pulp, paper or allied products accounting for 17 percent (1.2 million tons) of the total tons moved in 2011. Most of these rail shipments are through traffic originating or terminating in Maine or Massachusetts. The next top commodity group is clay, concrete, glass or stone products, which make up 16 percent (1 million tons) of the rail tonnage moving in the state. These shipments are most commonly comprised of outbound limestone slurry. Following are lumber or wood products, and chemicals or allied products, which make up each 12 percent (800 thousand tons) of the total rail tons in 2011. Coal comprises 9 percent (600 thousand tons) of the total rail tons on Vermont's rail network in 2011; all of these shipments are through moves.

Petroleum or coal products, and food products comprised 8 percent and 7 percent respectively of the total tons shipped (about 500 thousand tons each). Approximately half of the petroleum or coal products shipments (i.e., gasoline, gas propane, petroleum oil and fuel oil) are inbound from New York and Canada and the rest are through traffic. Another important inbound commodity is non-metallic minerals (i.e., rock salt) coming from New York and Canada. The remaining top commodities, freight all kinds (that is, miscellaneous mixed shipments usually moving as intermodal shipments), transportation equipment, primary metal products, farm products, waste or scrap materials, and others, accounted for 13 percent or 900 thousand tons in 2011.

Exhibit 17: Top Rail Commodities 2011 Weight (in Thousands of Tons)

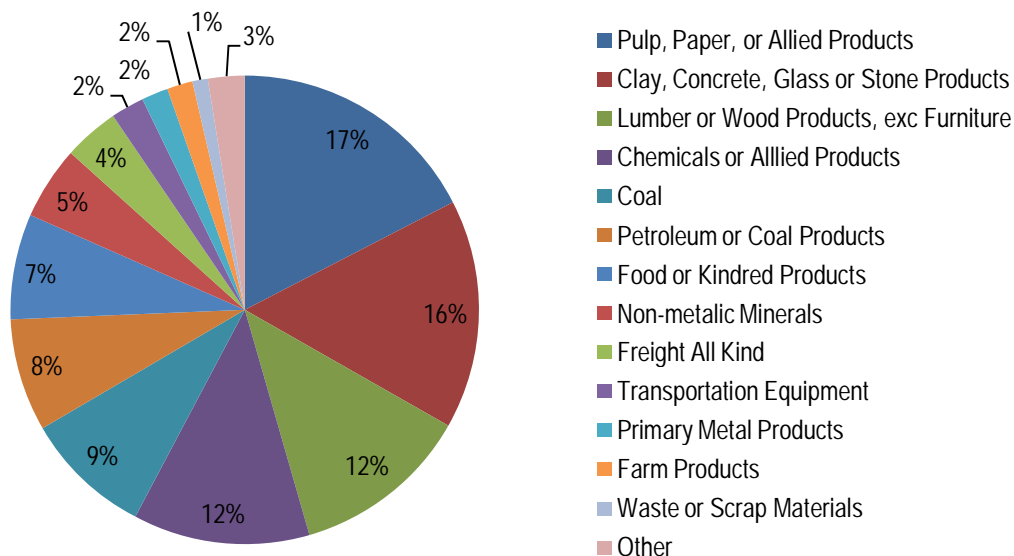
STCC2	Commodity	Rail Freight Movements (in thousands of tons)					Percent
		Inbound	Intrastate	Outbound	Through	Total	
26	Pulp, Paper, or Allied Products	8	0	3	1,144	1,155	17%
32	Clay, Concrete, Glass or Stone Products	12	0	766	270	1,048	16%
24	Lumber or Wood Products, exc Furniture	79	282	0	454	815	12%

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28	Chemicals or Allied Products	37	0	2	771	810	12%
11	Coal	0	0	0	584	584	9%
29	Petroleum or Coal Products	232	0	0	285	517	8%
20	Food or Kindred Products	227	0	0	254	481	7%
14	Non-metallic Minerals	273	44	0	16	333	5%
46	Freight All Kind	0	0	0	255	255	4%
37	Transportation Equipment	0	0	0	153	153	2%
33	Primary Metal Products	17	0	0	105	122	2%
01	Farm Products	76	0	0	41	117	2%
40	Waste or Scrap Materials	0	0	4	67	71	1%
	Other	0	0	0	168	168	3%
	TOTAL	961	326	775	4,567	6,628	

Exhibit 18: Top Rail Commodities 2011 Weight



The mix of commodities for Vermont's outbound rail shipments has been rather concentrated for some time; in 2002⁶, 95 percent of the outbound rail tonnage was limestone, and the remaining 5 percent was lumber or wood products, and food products. In 2011, the mix of commodities became even more concentrated, with 99 percent of outbound rail tonnage now consisting of limestone-related products.

⁶ Vermont Agency of Transportation, VT State Rail & Policy Plan, 2006.

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The commodity mix for inbound rail shipments is broader. In 2002⁷, the distribution of commodities for inbound rail shipments by weight was comprised of petroleum or coal products (37 percent), non-metallic minerals, glass or stone products (18 percent), food products (16 percent), lumber or wood products (14 percent), farm products (8 percent), and others (6 percent). In 2011, the inbound commodity mix was similar; however the overall inbound rail tonnage decreased by 33 percent from 2002, from 1.4 million to 961 thousand tons.

Top Rail Trading Partners

In addition to the analysis by direction and commodity summarized in the previous sections, it is also important to identify the state's key rail trading partners. A better understanding of where the state's rail shipments are originating and terminating is a critical step to understanding length of haul, market penetration, and modal preference. Key trading partners are identified by combining the inbound and outbound rail freight flows between Vermont and the trading partner region.

The "trading partners" (external to Vermont) have been defined as consisting of the states in the New England region, New York, New Jersey, Pennsylvania, the U.S. Census regions and divisions in the rest of the U.S., and the neighboring countries of Canada and Mexico.

The trading partners for rail movements into and out of Vermont by weight in 2011 are shown in Exhibit 19. New York, Canada, Maine, and the South Atlantic region accounted for 75 percent (1.3 million tons) of total inbound and outbound rail flows by weight.

New York is Vermont's top rail trading partner accounting for 27 percent (480 thousand tons) of total inbound and outbound rail flows by weight in 2011. Vermont's rail trade with New York is all inbound traffic. New York's rail shipments to Vermont include rock salt, petroleum products, and to a lesser extent, food products.

Canada is Vermont's second largest rail trading partner, accounting for 18 percent (300 thousand tons) of total inbound and outbound rail flows by weight in 2011. Sixty-eight percent of the trade between Canada and Vermont is inbound (southbound) and the remaining 32 percent is outbound (northbound). Inbound traffic from Canada consists of petroleum products, lumber or wood products, farm products, and food products. Outbound traffic to Canada is mostly limestone slurry.

Maine is another top rail-trading partner for Vermont. Rail traffic between Vermont and Maine represented 15 percent (260 thousand tons) of total inbound and outbound rail tonnage in 2011. These rail moves primarily consist of limestone slurry—which is used in the production of paper—being shipped from Vermont to Maine.

Trade with the South Atlantic region, as with Maine, represented 15 percent (260 thousand tons) of total inbound and outbound rail tonnage in 2011. About 80 percent of the trade with the South Atlantic is limestone shipped from Vermont to Virginia, Maryland and Georgia. The remaining 20 percent consist of chemicals, plywood, and kaolin shipped from South Carolina and Georgia.

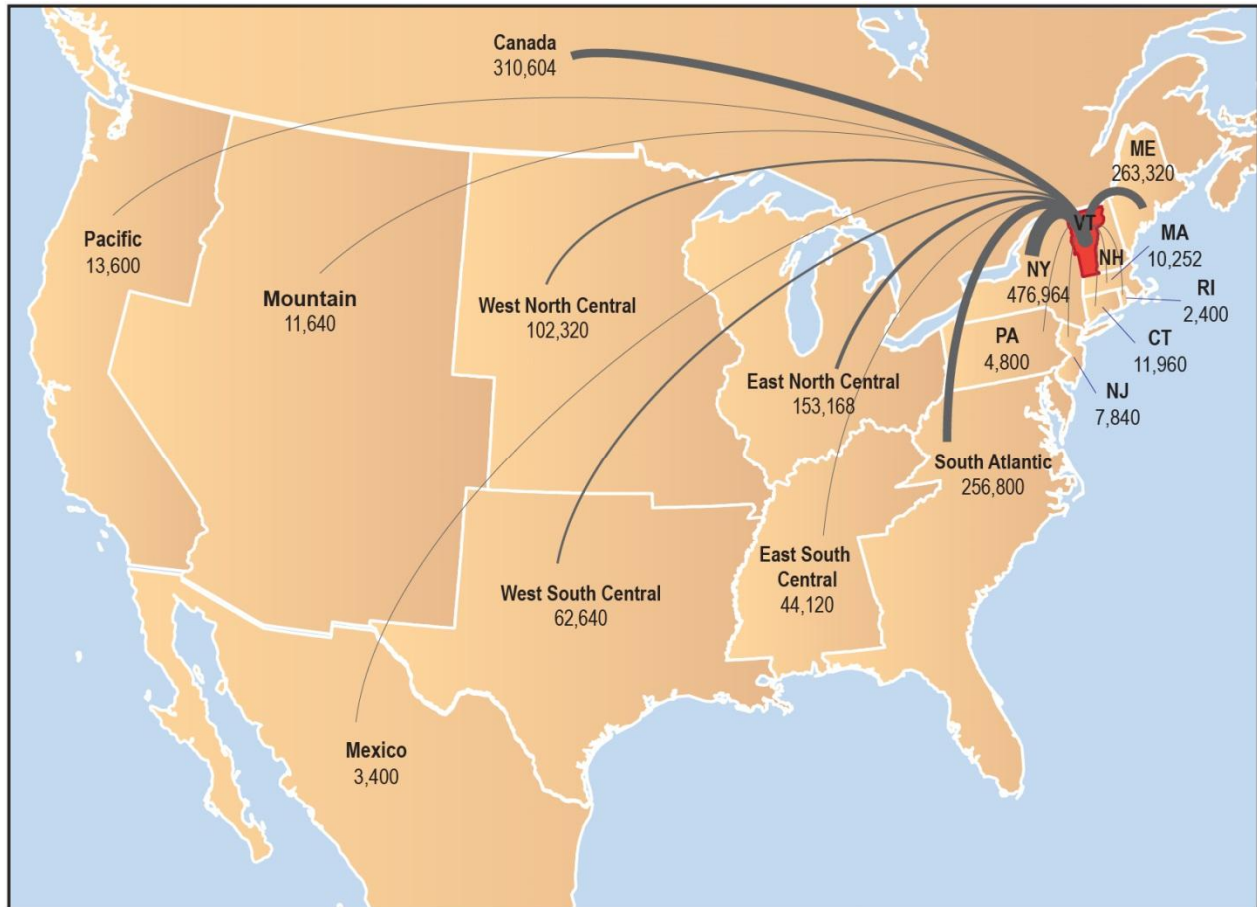
⁷ Ibid.

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Exhibit 19: Rail Trading Partners

2011 Weight on Tons



Rail Through Traffic

Through traffic comprises the largest single component of Vermont's rail freight volume, representing 69 percent and 4.6 million tons of Vermont's tonnage in 2011. Through traffic is critical to the continued vitality of rail service in Vermont and Vermont's strategic geographic position as one of the gateways to Canada is a key element. Exhibit 20 shows the top origin-destination pairs for the rail through traffic in Vermont. Most of Vermont's rail through originates or terminates in Canada, Maine, Massachusetts, and New Hampshire. Traffic flowing between Canada and Maine is largely handled by the St. Lawrence & Atlantic, and the Montreal, Maine & Atlantic to a lesser degree. Other through markets are primarily served by Pan Am Southern, and to a lesser degree, the New England Central and Vermont Rail System subsidiaries CLP and GMRC.

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Exhibit 20: Top Rail Through Origin-Destination Pairs - 2011 Weight (in Thousands of Tons)

Origin	Destination	Tons 2011 (in 1,000's)	Percent
Canada	Maine	552	12%
Pennsylvania	New Hampshire	495	11%
Canada	Massachusetts	431	9%
East North Central	Massachusetts	377	8%
West North Central	Rhode Island	282	6%
Massachusetts	East North Central	252	6%
Maine	East North Central	211	5%
Canada	New Hampshire	176	4%
Canada	Connecticut	149	3%
South Atlantic	Maine	149	3%
Other		1,493	33%
TOTAL		4,567	100%

Rail Flows

Exhibit 23 displays the volume of freight tonnage moving over Vermont rail network in 2011. The majority of the rail traffic in Vermont was through traffic (69 percent or 4.6 million tons in 2011). Approximately half of this traffic moved on the 7-mile segment of the Pan Am Southern Railway (PAS) line that traverses the southwest corner of the State, linking the Albany, New York area with eastern Massachusetts, New Hampshire and Maine. The remaining through traffic moved on the St. Lawrence & Atlantic (SLR) in the northeast corner of the State (1.1 million tons), the New England Central Railroad (NECR) from Canada via East Alburg traversing all of the State to interchanges in Massachusetts (700 thousand tons), and on the Clarendon & Pittsford Railroad (CLP) - Green Mountain Railroad Corp (GMRC) – NECR through route (400 thousand tons).

The CLP line between Rutland and Whitehall, NY handled over 1.2 million tons in 2011, consisting of a balanced mix of inbound, outbound and through rail traffic. Over half (520 thousand tons) of the inbound traffic in Vermont entered the state on the CLP, interchanging with VTR in Rutland. East Alburg and the interchange between CN and NECR came in second at 190 thousand tons and approximately 25 percent of inbound traffic.

Ninety-five percent (738 thousand tons) of the outbound traffic originated in Rutland County. Almost half (333 thousand tons) of this traffic exited Vermont on the CLP. Another third (260 thousand tons) exited via Bennington and Hoosick Junction, NY on the VTR.

Intra-state traffic constitutes only 5 percent (326 thousand tons) of the total rail traffic in the State. Most of the intrastate rail traffic (282 thousand tons) moves between Franklin County (Saint Albans) and Chittenden County (Burlington) on the NECR.

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Exhibit 21: 2011 Rail Traffic Flows, in Tons

